

Notice of Allowability

Application No.

09/870,698

Examiner

Kimnhung Nguyen

Applicant(s)

MORRISON ET AL.

Art Unit

2674

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 8-6-04.
2. ☒ The allowed claim(s) is/are 1,5-12 and 14-37.
3. ☒ The drawings filed on 6-1-01 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


RICHARD HJERPE

SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

DETAILED ACTION

This Application has been examined. The claims 1, 5-12 and 14-37 are pending. The examination results are as following.

Examiner's Amendment

1. Authorization for this Examiner's Amendment was given in a telephone interview with Ms. Dawn C. Hayes on 9/17/04.

23. (Amended) A touch system comprising:

a substantially rectangular touch surface;

imaging devices mounted adjacent at least three corners of said touch surface to define at least two triangulation pair of imaging devices, each imaging device having a field of view looking across said touch surface, said imaging devices being oriented to capture overlapping images of said touch surface; and

at least one processing device processing captured images to determine the position of at least one pointer appearing in the captured images based on multiple triangular results, the fields of view of said imaging devices being calibrated by said at least one processing device to determine offset angles of said imaging devices prior to determining the position of the at least one pointer thereby to align said multiple triangulation results.

27. (Amended) A user input system comprising:

at least two pair of imaging devices having overlapping fields of view oriented to capture images of a region of interest in which at least one pointer can be positioned; and

at least one processing device processing pointer data extracted from the captured images acquired by the imaging devices using triangulation to yield a triangulation result for each pair of imaging devices thereby to determine the position of said at least one pointer within said region of interest, said at least one processing device adjusting the pointer data prior to processing by determining offset angles of said imaging devices to compensate for fields of view of said imaging devices that extend beyond the periphery of said region of interest thereby to align the triangulation results.

Reasons For Allowance

2. The following is an examiner's statement of reasons for allowance: The present invention is directed to a method of determining the position of an object relative to a reference frame from captured image of the object based on multiple triangulation and the captured images being taken by at least two cameras. The closest prior art, McAviney (US 4,746,770) and O'Brien et al. (US 4,247,767) show a similar system also disclose the a reference frame from captured image of the object based on triangulation and the captured images being taken by at least two pair cameras. However, they fail to teach the method of determining the position of an object relative

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to a rectangular reference frame from captured images of the object based on multiple triangulation results, the captured images being taken by at least two pair of cameras at the corner of said reference frame, wherein each of the cameras having a field of view offset with respect to said reference frame, and processing (see the equations) of claim 1, or determining the offset angle for each offset camera; for each offset camera subtracting the offset angle from the angle representing the position of the object within the image taken by said offset camera to calibrate the angle; for each pair of cameras using the calibrated angles to calculate the position of the object with respect to the reference frame using triangulation as claim 7, or a touch system at least two pair of cameras, determining an offset angle of each camera relative to the reference frame, said offset angle representing the degree by which the field of view of the camera extends beyond said reference frame; for each camera, using the offset angle to calibrate the object position data developed from the image acquired by that camera; and using the calibrated object position data during triangulation for each pair of cameras to determined the position of said object relative to said reference frame as claim 9, or determining the position of the object within each captured image being represented by an angle, said angle being equal to the angle formed between an extremity of the field of view of the camera that acquired the image extending beyond the reference frame and a line extending from that camera that intersects the object within the image; and mathematically calculating the offset angles of the cameras having rotated fields view based on the angle determined for each image and the position of the cameras relative to the coordinate system assigned to said reference frame as claim 10, or a processor processing the captured images and generating object position or pointer data when an object or pointer appears the images, said processor determining the position of said object relative to said origin

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in rectangular coordinates using said object position data or pointer based on multiple triangulation results, wherein said processor further executes a calibration routine to determine offset angles of said cameras, said offset angles being used by said processor to adjust said object position data or pointer thereby to align said multiple triangulation results prior to said position determination as claim 12, or the fields of view of said imaging devices being calibrated by said at least one processing device to determine offset angles of said imaging devices pointer thereby to align said multiple triangulation results as claims 23 and 27.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimnhung Nguyen whose telephone number (703) 308-0425.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **RICHARD A HJERPE** can be reached on (703) 305-4709.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D. C. 20231

Or faxed to:


(703) 872-9314 (for Technology Center 2600 only).

Hand-delivery response should be brought to: Crystal Park II, 2121 Crystal Drive,
Arlington, VA Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Kimnhung Nguyen
September 20, 2004


RICHARD HJERPE 9/20/04
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600